IN THE CLAIMS:

1. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, comprising:

after sample exposure/coupling, simultaneously irradiating a plurality of the DNA probe cells of said DNA chip with a corresponding plurality of multi-spot excitation lights through an objective lens ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to generate fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe ~~cells, where each light of said multi-spot excitation lights having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates~~ cells;

separating ~~dividing~~ said generated fluorescent lights from said plurality of multi-spot excitation lights into separate fluorescent lights along separate optical paths;

detecting said separate fluorescent lights simultaneously with a plurality of sensors, with each sensor corresponding to each of said DNA probe cells irradiated, ~~sensor after reducing components of said multi-spot excitation lights reflected from said DNA chip~~ so as to catalog positions and intensities of detected fluorescent lights

which are representative of a coupled state of the hybridized target DNA on said DNA chip.

2. (Previously presented) The method as claimed in Claim 1, wherein said plurality of multi-spot excitation lights are arranged in a 1-dimensional or 2-dimensional configuration.

3. (Currently Amended) The method as claimed in Claim 1, comprising:

arranging said plurality of multi-spot excitation lights irradiated onto said DNA chip on a straight line with a spacing of kd with reference to ~~said~~ a spot diameter d and an integer k; and

repeating an operation in sequence k times, said operation being an operation where, after said irradiation with said plurality of multi-spot excitation lights has been performed, ~~during said time Δt,~~ said plurality of multi-spot excitation lights are displaced in substantially a direction of said straight line by substantially d and said irradiation is performed again; ~~during said time Δt;~~ and thereby

executing said inspecting ~~toward kM spot positions~~ substantially in said straight line direction; and

displacing said DNA chip and said objective lens relatively at least in a direction substantially perpendicular to said straight line direction; and thereby

inspecting a desired 2-dimensional area on said DNA chip.

4. (Previously presented) The method as claimed in Claim 1, comprising providing fluorescent light detection deflecting means within said separate optical paths so that said generated fluorescent lights are synchronized with displacement of said plurality of multi-spot excitation lights and come onto substantially the same location on light-receiving apertures.

5. (Previously presented) The method as claimed in Claim 4, wherein said fluorescent light detection deflecting means includes a wavelength selection beam splitter for permitting said plurality of multi-spot excitation lights to pass therethrough and causing said generated fluorescent lights to be reflected.

6. (Previously presented) The method as claimed in Claim 1, comprising providing a filter within a fluorescent light detecting optical path isolated from an excitation optical path, said filter permitting only said generated fluorescent lights to pass there-through while light-shielding said plurality of multi-spot excitation lights.

7. (Previously presented) The method as claimed in Claim 1, comprising forming said plurality of multi-spot excitation lights by using a plurality of laser light-sources.

8. (Previously presented) The method as claimed in Claim 7, wherein said plurality of multi-spot excitation lights are obtained by:

guiding, into optical fibers, lights emitted from said plurality of laser light-sources; and causing said lights to be emitted from light-emitting ends of said optical fibers, said light-emitting ends being aligned with M desired pitches.

9. (Previously presented) The method as claimed in Claim 1, wherein said plurality of excitation lights include a plurality of different wavelengths, and the method comprising distinguishing ones of the DNA probe cells as different targets on said DNA chip, where a plurality of fluorescent materials responsive to ones of the plurality of different wavelengths are used to distinguish a plurality of different targets.

10. (Previously presented) The method as claimed in Claim 9, comprising:

performing simultaneous irradiation with said plurality of multi-spot excitation lights including said plurality of different wavelengths; and thereby

distinguishing said different targets on said DNA chip so as to simultaneously detect said different targets in accordance with said plurality of fluorescent materials.

11. (Previously presented) The method as claimed in Claim 1, comprising:

directing a second light with an oblique incident angle on an inspection plane of said DNA chip;

detecting a reflection position at which said second light is reflected on said inspection plane; and

controlling a relative distance between said inspection plane and said objective lens in accordance with a result of detection of said reflection position.

12.-17. (Canceled)

18. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, comprising:

branching a laser beam so as to form eight or more beams, said laser beam being emitted from at least one laser light-source;

after sample exposure/coupling, simultaneously irradiating a corresponding eight or more of the DNA probe cells on an inspection plane of a DNA chip with said eight or more beams, respectively, ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to generate fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells; ~~, where each beam of said eight or more beams having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates;~~

separating fluorescent lights emitted from irradiated ones of the DNA probe cells of said DNA chip, from reflected lights of said eight or more beams;

detecting said separated fluorescent lights simultaneously with a plurality of sensors, each sensor corresponding to each of said DNA probe cells irradiated; and, ~~sensor; and~~

getting information from said DNA chip by cataloging position and intensities of detected fluorescent lights which are representative of a coupled state of the hybridized target DNA on said DNA chip.

19. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, comprising:

branching a laser beam into a plurality of beams having substantially the same intensity, said laser beam being emitted from at least one laser light-source;

after sample exposure/coupling, simultaneously projecting said plurality of beams onto a corresponding plurality of the DNA probe cells on an inspection plane of the DNA chip through a projection optical unit, ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to generate fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells; ~~, where each beam having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates;~~

detecting, through an imaging optical unit, images of fluorescent lights emitted from irradiated ones of the DNA probe cells of said DNA chip simultaneously with a

plurality of sensors, each sensor corresponding to each of said DNA probe cells irradiated; and

getting information from said DNA chip by cataloging position and intensities of detected fluorescent lights ~~which are representative of~~ concerning a coupled state of the hybridized target DNA on said DNA chip.

20. (Previously presented) The method as claimed in Claim 19, wherein said DNA chip is inspected by irradiating said DNA chip with said beams while displacing said DNA chip and said beams relatively in a 2-dimensional manner.

21. (Previously presented) The method as claimed in Claim 19, wherein said DNA chip is irradiated with said beams arranged in 2-dimensions.

22. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, comprising:

after sample exposure/coupling, simultaneously irradiating a plurality of the DNA probe cells of said DNA chip with a corresponding plurality of multi-spot excitation lights ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to emit fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells; ~~, where each light of said~~

~~multi-spot excitation lights having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates;~~

separating said fluorescent lights emitted from ones of the DNA probe cells of said DNA chip, from said plurality of multi-spot excitation lights:

detecting images of said fluorescent lights simultaneously by use of a plurality of light detecting devices capable of executing a photon counting, each light detecting device corresponding to each of said DNA probe cells irradiated;

photon-counting, individually, each of photon signals obtained from said respective light detecting devices;

storing, individually, data of photon-counted numbers Npm detected by said respective light detecting devices;

changing positions of said plurality of multi-spot excitation lights and a position of said DNA chip relatively, so as to store data of said photon-counted numbers from said respective light detecting devices;

collecting stored data on said photon-counted numbers over a desired range on said DNA chip;

constructing a fluorescent light image from said collected data; and

deriving information for said DNA chip from information on said constructed fluorescent light image, by cataloging positions and intensities of detected fluorescent lights which are representative of a coupled state of the hybridized target DNA on said DNA chip.

23. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, comprising:

after sample exposure/coupling, simultaneously irradiating a plurality of the DNA probe cells of said DNA chip with a sheet-shaped excitation light ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to emit fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells;

separating said fluorescent lights emitted from ones of the DNA probe cells, from said sheet-shaped excitation lights;

detecting images of said fluorescent lights <u>simultaneously</u> by use of a plurality of light detecting devices capable of executing a photon counting<u>, each light detecting device corresponding to each of said DNA probe cells irradiated</u>;

photon-counting, individually, each of photon signals obtained from said respective light detecting devices;

storing, individually, data of photon-counted numbers Npm detected by said respective light detecting devices;

changing positions of irradiation areas and a position of said DNA chip relatively, so as to store in sequence data of said photon-counted numbers from said respective light detecting devices;

collecting stored data on said photon-counted numbers over a desired range on said DNA chip;

constructing a fluorescent light image from said collected data, and

deriving information for said DNA chip in accordance with information on said constructed fluorescent light image, by cataloging positions and intensities of detected fluorescent lights which are representative of a coupled state of the hybridized target DNA on said DNA chip.

24. (Previously presented) The method as claimed in Claim 22, wherein said multi-spot excitation lights include 10 or more microscopic spots.

25. (Previously presented) The method as claimed in Claim 24, wherein said multi-spot excitation lights include 50 or more microscopic spots.

26. (Previously presented) The method as claimed in Claim 24, wherein said microscopic spots are arranged on a 1-dimensional straight line or a 2-dimensional array.

27. (Previously presented) The method as claimed in Claim 22 or 23, wherein said multi-spot excitation lights or said sheet-shaped excitation lights are colored lights having 2 or more wavelengths.

28. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, by detecting fluorescent lights generated from a fluorescent material on a DNA sample, comprising:

after sample exposure/coupling, simultaneously irradiating a plurality of the DNA probe cells of said DNA chip with a corresponding plurality of multi-spot excitation lights or a sheet-shaped excitation light ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to generate fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells, separating said fluorescent lights from said plurality of multi-spot excitation lights irradiated onto said DNA sample, said multi-spot excitation lights including M microscopic spots, where M is an integer;

detecting fluorescent light images from said fluorescent lights emitted from said DNA chip with the use of a plurality of M light detecting devices in an average pixel detecting time of (300 μsec/M) or less, each light detecting device corresponding to each of said DNA probe cells irradiated;

storing, individually, signals obtained from said respective light detecting devices:

changing, relatively, positions of said multi-spot excitation lights or said sheet-shaped excitation light and a position of said DNA chip so as to store said signals in sequence;

collecting said stored signals over a desired range on said DNA chip;

constructing a fluorescent light image from said collected and stored signals; and

deriving information from said DNA chip in accordance with information on said constructed fluorescent light image, by cataloging positions and intensities of detected fluorescent lights which are representative of a coupled state of the hybridized target DNA on said DNA chip.

29. (Currently Amended) A method of inspecting a coupled state of hybridized target DNA on a DNA chip that includes a plurality of DNA probe cells having a DNA probe to which fluorescently labeled target DNA may hybridize, ones of the DNA probe cells being of a microscopic dimensional size D, where DNA probes are arranged on the DNA chip in a predetermined array, by detecting fluorescent lights generated from a fluorescent material on a DNA sample, comprising:

after sample exposure/coupling, simultaneously irradiating a plurality of the DNA probe cells of said DNA chip with a corresponding plurality of multi-spot excitation lights or a sheet-shaped excitation light ~~for a time Δt that is longer than a fluorescent light attenuation time~~ so as to generate fluorescent lights from any fluorescently labeled target DNA hybridized to ones of the DNA probes of the plurality of DNA probe cells, separating said fluorescent lights from said plurality of multi-spot excitation lights irradiated onto said DNA sample, said multi-spot excitation lights including M microscopic spots having a diameter or focus-achieving width which is smaller than 3 μm and larger than 0.3 μm, said sheet-shaped excitation

lights having a width that is smaller than 3 μm and larger than 0.3 μm, where M is the number of microscopic spots;

detecting fluorescent light images emitted from said DNA chip simultaneously with use of a plurality of light detecting devices, each light detecting device corresponding to each of said DNA probes irradiated;

storing, individually, signals obtained from said respective light detecting devices;

changing, relatively, positions of said multi-spot excitation lights or said sheet-shaped excitation light and a position of said DNA chip so as to store said signals in sequence;

collecting said stored signals over a desired range on said DNA chip;

constructing a fluorescent light image from said collected signals; and

deriving information for said DNA chip in accordance with information on said constructed fluorescent light image, by cataloging positions and intensities of detected fluorescent lights which are representative of a coupled state of the hybridized target DNA on said DNA chip.

30.-35. (Canceled)

36. (New) The method as claimed in Claim 1, wherein said plurality of the DNA probe cells of said DNA chip are simultaneously irradiated with the corresponding plurality of multi-spot excitation lights for a time Δt that is longer than a fluorescent light attenuation time.

37. (New) The method as claimed in Claim 1, wherein each light of said multi-spot excitation lights having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates.

38. (New) The method as claimed in Claim 18, wherein said eight or more of the DNA probe cells are simultaneously irradiated with said eight or more beams, respectively, for a time /\t that is longer than a fluorescent light attenuation time.

39. (New) The method as claimed in Claim 18, wherein each beam of said eight or more beams having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates.

40. (New) The method as claimed in Claim 19, wherein said plurality of beams are simultaneously projected for a time Δt that is longer than a fluorescent light attenuation time.

41. (New) The method as claimed in Claim 19, wherein each beam having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates.

42. (New) The method as claimed in Claim 22, wherein the plurality of the DNA probe cells are irradiated for a time Δt that is longer than a fluorescent light attenuation time.

43. (New) The method as claimed in Claim 22, wherein each light of said multi-spot excitation lights having a spot diameter d that is smaller than the dimensional size D of a DNA probe cell that it irradiates.

44. (New) The method as claimed in Claim 23, wherein the plurality of the DNA probe cells are simultaneously irradiated for a time Δt that is longer than a fluorescent light attenuation time.

45. (New) The method as claimed in Claim 28, wherein the plurality of the DNA probe cells excitation lights are simultaneously irradiated for a time Δt that is longer than a fluorescent light attenuation time.

46. (New) The method as claimed in Claim 29, wherein the plurality of the DNA probe cells are simultaneously irradiated for a time Δt that is longer than a fluorescent light attenuation time.